

# ***User's Manual***



***In-Line***

***Buffer Unit***

This manual is intended for the inline device specified on the previous page. The manual contains information to assist the operator to start and operate the device properly, and to maintain it. Hardware and software mentioned in this document are subjected to continuous development and improvement. Consequently, there may be minor discrepancies between the information in the document and the performance and design of the hardware and software. Specifications, dimensions and other statements mentioned in this document are subject to change without prior notice.

### **Conventions**

In this manual angle brackets <> are used to indicate certain button names. Example: <Enter> stands for the ENTER button.

The manufacturer and its suppliers shall not be liable for any damages related to the software or hardware, or for any other damages whatsoever caused by the use of, or inability to use any manufacturers product. This is applicable even if the manufacturer has been advised of the damage risk. Under any circumstances, the manufacturer's entire liability shall be limited to replace such defective software or hardware, which was originally purchased from the manufacturer.  
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# 1. Safety

Before starting the machine, it is necessary that the operator, foreman, and any other personnel involved in the machine operation, maintenance, or service, understand and obey the following:

- Trained personnel must operate the machine only.
- Anyone operating this machine must obey all warning signs.
- All personnel involved in machine operation must understand the use of the emergency stop button and how to move machine elements in case of emergency. See the following sections entitled *Emergency Stop Buttons* and *Emergency Movement of Machine Elements* in this chapter.
- Apart from weekly maintenance described in Chapter 5, *Maintenance*, the machine is to be serviced by authorised personnel only.
- No hands or fingers are allowed in the vicinity of moving parts.
- Ensure that all covers and shields are intact, mounted and closed while the machine is in operation.
- Do not disable or disengage any safety switches or sensors.
- Do not use chemicals or other substances that may have any influence on the operator or other personnel involved in machine operation.

## Emergency stop buttons

There are two emergency stop buttons on the machine. One on the front and one on the back of the machine.

Emergency stop buttons are red and stops all machine movements immediately when either one is pressed down.

An emergency stop button is released by being pulled up and/or turned counter clockwise.

At least one emergency stop button must be pressed down when hands, fingers, tools or other objects are in the risk area of movable machine elements.

### **Restart**

To restart the machine after an emergency stop:

1. Release the emergency stop buttons by pulling them up and/or turning them counter clockwise.
2. Start the operation as normal.

## Emergency movement of machine elements

### **The elevator cannot be moved by hand!**



*If an accident has occurred and an emergency movement of the elevator unit is required, use the following procedure:*

1. Leave the power on. Do NOT turn off the main power switch.
2. Release the emergency stop button(s) by pulling it up and/or turning it counter-clockwise.
3. Reset the emergency stop alarm by pressing <F4> on the control panel.
4. Press <F3> 'Hand' in *Main* menu to enter *Hand* mode.
5. Press <F4> in *Hand* menu to enter *Elevator* menu.
6. Use orange buttons '▲' and '▼' to move the elevator up and down.

## Warning signs

The warning signs on the machine must be observed as this machine contains moving and electrically live parts.

All signs must be kept clean and readable. If a sign is missing, it must be replaced immediately.

### **Electric shock**

The sign warns of electric shock. Units on which this sign is placed contain dangerous voltage levels. Power must be switched off before opening the unit. Only authorised service personnel are allowed to operate the machine when the unit is open.



*Figure 1-1 Electric shock*

### **Moving parts, risk of injury**

The sign warns of moving machine parts. If this sign is placed on the machine, there is a risk of injury if any body part is near moving parts. Power must be switched off before service or maintenance.



*Figure 1-2 Moving parts, risk of injury*

## Warnings

### **Attention**

Throughout the manual, this symbol is used to call your attention to commands that starts machine movements or other events that need special attention. The symbol often refers to the warning signs, which must be obeyed to eliminate the risk of injury. If there are instructions accompanying this symbol, they must be followed.



*Figure 1-3 Attention*

## 2. Installation

The machine is delivered on a pallet:

Before unpacking the machine, make sure that the site is prepared as described below.

Then, unpack and position the machine on the site.

When the machine is located on its site, install it as described last in this chapter.

### Site preparation

Prior to installing the machine, ensure that there is electric power and compressed air available on the site. See requirements below.

Make sure the environmental conditions meet the requirements specified below.

Note that it must be a free space of at least one meter around the machine, except for other devices and machines included in the conveyor line.

### Power supply requirements

#### **Voltage**

Supply voltage:	115/240 VAC
Voltage tolerance:	±10%
Frequency:	50/60Hz
Power consumption:	900 Watt maximum

#### **Compressed air**

The compressed air must be dry and clean.

Pressure:	6-8 bar
Largest particle size:	5 micron



## Environmental requirements

### Temperature

Operating:	+5 to +40°C (41 to 104°F)
Storage:	-40 to +60°C (-40 to 140°F)

### Relative humidity

Operating:	<95%, non condensing
Storage:	100%

### Dust and dirt

The machine does not require a clean-room environment but the level of dust and dirt must be kept as low as possible. The maintenance intervals are shortened by high temperature and dusty or dirty environment.

## Installation



*The installation must be carried out by authorized service personnel.*

### **Placing the unit**

Ensure that the floor is sturdy.

Place the machine on its site. To be able to install, maintain and service the machine, there must be a free space of at least one meter around it, except for other devices and machines included in the conveyor line.

### **Levelling**

Level the complete line carefully along the conveyor belts. Use a spirit level across and along the elevator, and adjust the feet of the machine. The machine must stay steady on all feet when the adjustment is finished.

### **Mains supply**



*Mains supply is to be connected by an authorised electrician.*

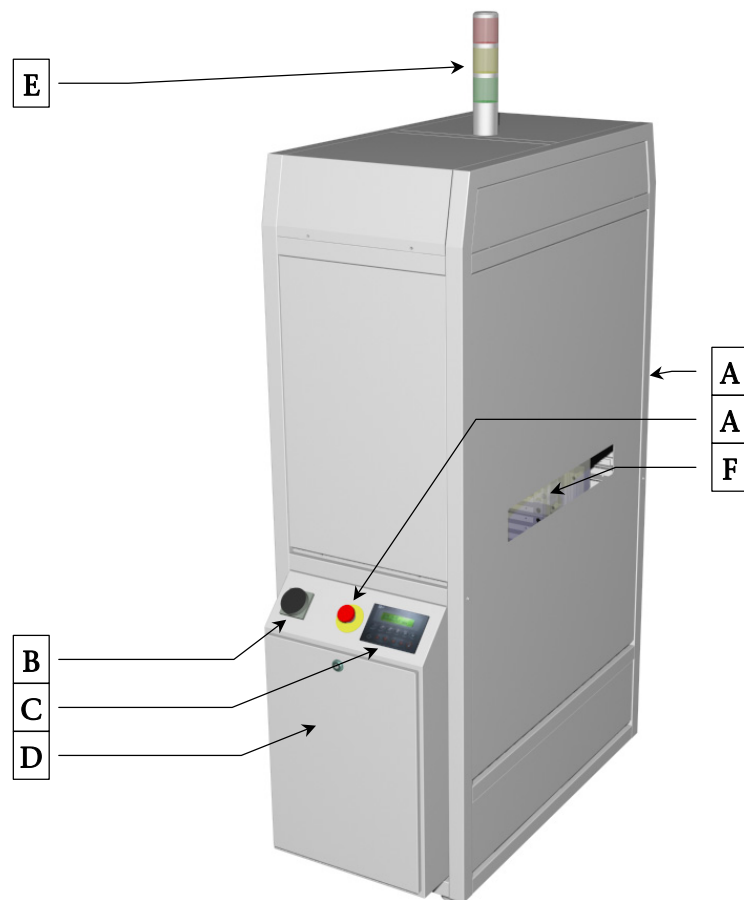
The internal power supply can be adapted to two different mains voltage levels, 115 or 240 VAC. Use the selector switch on the front of the power supply to select correct setting according to available mains voltage. Disconnect mains supply using the main switch before changing selector switch position.

## 3. Product Description

This chapter describes the Buffer. The description is divided into the following main sections:

- Main parts of the machine, page 9.
- General function, page 10.
- Control panel and buttons in the panel, page 11.
- Operation modes, page 12.
- Alarms and messages, page 21.
- Signal tower and buzzer, page 23.

## Main parts



*Figure 3-1 Buffer main parts*

The following main parts are pointed out in the figure above, by the letters.

### Main parts

- A. Emergency stops
- B. Main switch
- C. Control panel
- D. Electrical cabinet
- E. Status indicator (Light tower)
- F. Elevator/Magazine

## General function

The Buffer Unit is designed to move printed circuit boards from a PCB assembly inline system through the PCB inlet, into the fixed magazine and, if the following machine is ready, move printed circuit boards from the fixed magazine, through the PCB outlet, back to a PCB assembly inline system.

The Buffer Unit can be set to three different production modes. They are selected for from the control panel, and function for each mode is as follows:

### **LIFO mode**

The Buffer Unit receives printed circuit boards unless it is full. The boards are fed out, one by one, in the reverse order they were received, when the following machine is ready to receive boards. If the magazine becomes full, the buzzer sounds for two seconds and the yellow status lamp is lit until a slot is available for arriving boards again.

### **FIFO mode**

The Buffer Unit receives printed circuit boards unless it is full. The boards are fed out, one by one, in the same order they were received, when the following machine is ready to receive boards. If the magazine becomes full, the buzzer sounds for two seconds and the yellow status lamp is lit until a slot is available for arriving boards again.

### **PASS THROUGH mode**

The Buffer Unit receives printed circuit boards into a slot, specified by the operator. The board is fed out from the same slot when the following machine is ready to receive a board. No boards are buffered and no elevator movements are performed in this mode.

## Control panel

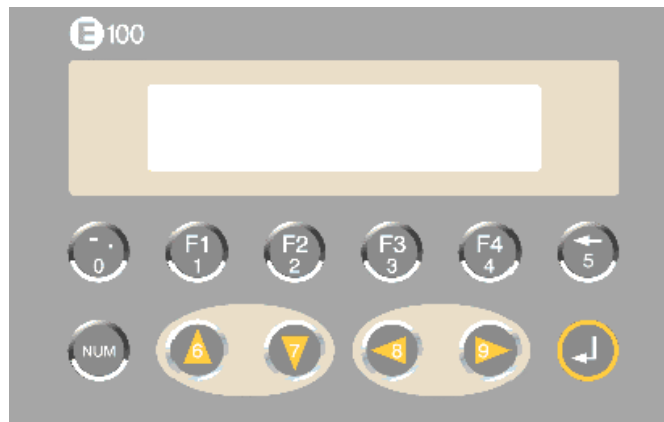


Figure 3-2 Control panel

### General

The machine is controlled from a control panel. The various display views and operation modes are described in the following sections.

### Function Buttons

<F1>...<F4>:

Use these buttons to control the machine.

The buttons have different functions depending on mode and display view. A text/symbol describing the function in current display view is shown above each button on the lower text row. Buttons are indicated by bold angle brackets **< >** and text in this manual. Example: **<F1> Auto**.

### Control Buttons

- < ↵ >: Also written as <Enter>, is used to enter password login in setup mode, to select setting options and to enter parameter values.
- < ← >: Erases the character to the left of the cursor when entering parameter values.

### Numerical Buttons

- <NUM>: Hold this button while entering digits <0...9>. Use together with <NUM> to enter values. Finish with <Enter>.
- < - >: Press once for hyphen. Shifts between positive and negative values.
- < . >: Press twice rapidly for decimal point.

### Cursor Buttons (orange)

- < ▲ > and < ▼ >: Move cursor up or down. These buttons also control manual elevator movements in the elevator control display view.
- < ◀ > and < ▶ >: Move cursor to the previous or next option.

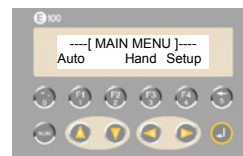
## Operation modes

### Powering up

After completed initiation the *Main* menu is shown on the control panel.

### Main menu

To control the machine, the following operation modes can be selected from the *Main* menu.



- *Automatic* mode
- *Hand* mode (Manual mode)
- *Setup* mode

### Selecting operation mode

You can select the desired operation mode from *Main* menu as follows:

- To enter *Automatic* mode, press <F1> 'Auto'.
- To enter *Hand* mode, press <F3> 'Hand'.
- To enter *Setup* mode, press <F4> 'Setup'.

To return to *Main* menu, press <F1> '«' repeatedly.



*In case of emergency, use the emergency stop button to stop the movement immediately.*

## Automatic mode

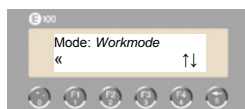
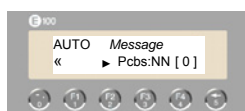
*Automatic* mode is used for production, i.e. to buffer PCBs if the following machine is occupied.



Select *Automatic* mode by pressing <F1> 'Auto' in the *Main* menu.

See page 10 for boardflow descriptions in *Automatic* mode.

### Automatic mode display views



Parameter/ <Button>	Description
	<u>Automatic mode</u> This display view is shown when entering <i>Automatic</i> mode.
<F1> « >	Return to <i>Main</i> menu. <i>Automatic</i> mode is set to OFF.
<F2> ► ►	Select next <i>Auto</i> menu (stepping/start slot setting). **
<F3> Not Used	Not used in this display view.
<F4> [0] [1]	Press <F4> to toggle state between [0] and [1]. [0]: <i>Automatic</i> mode is OFF. Production disabled. [1]: <i>Automatic</i> mode is ON. Production enabled.
Message	Shows the message <i>Buffer full</i> or <i>Nearly full</i> (if near full warning level is used). It also shows current work status of the elevator.
PCBs:NN	Number of currently buffered PCBs.  ** Only visible when <i>Automatic</i> mode is OFF and the buffer is empty.
<F1> « >	Return to previous menu.
<F2> ► ►	Select next <i>Auto</i> menu (work mode selection).
<F3> Not Used	Not used in this display view.
<F4> Not Used	Not used in this display view.
Stepping:NN	Number of magazine slots to move before next PCB is buffered. A value of 2 will skip one slot between each PCB during buffering.
Start:NN	First magazine slot to receive a PCB.
<F1> « >	Return to previous menu.
<F2> Not Used	Not used in this display view.
<F3> Not Used	Not used in this display view.
<F4> ↑↓	Toggle work mode. Available work modes are: <i>FIFO</i> , <i>LIFO</i> and <i>PassThrough</i> .
Workmode	Shows currently selected (active) work mode.



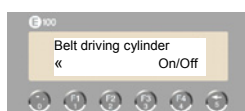
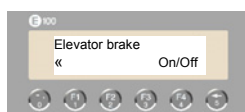
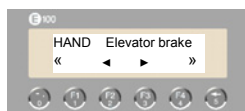
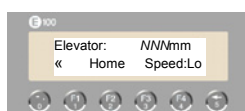
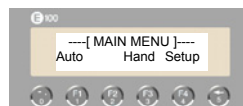
## Hand mode

*Hand mode is used to manually move the elevator unit and test various functions.*

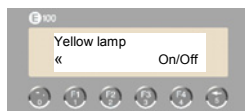
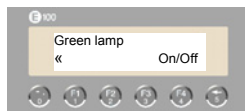
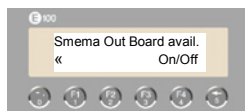
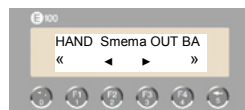
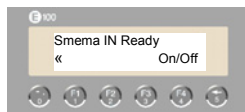
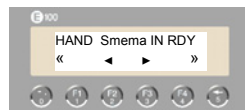
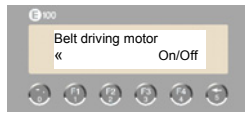


*In case of emergency, use the emergency stop button to stop the movement immediately.*

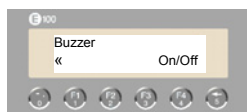
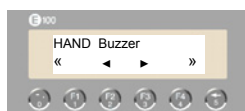
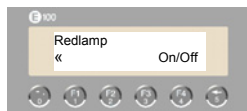
Select *Hand* mode by pressing <F3> 'Hand' in the *Main* menu.



Parameter/ <Button>	Description
	<u>First display view in <i>Hand</i> mode</u>
<F1> « > <F2> Not used <F3> ► ► <F4> » >	Return to <i>Main</i> menu. Not used in this display. Select next <i>Hand</i> sub menu. Enter current <i>Hand</i> sub menu.
NNNmm  <F1> « > <F2> Home <F3> <i>Speed sel.</i> <F4> <i>Speed sel.</i>  <▲> <i>Up</i> <▼> <i>Down</i>	This value shows the current position of the elevator unit, in millimetres, with reference to the home position sensor that gives a signal to the PLC when the elevator unit is in its uppermost position.  Return to previous display. Start an elevator home positioning. Toggle Low/High speed. Toggle Low/High speed.  Manually move the elevator upward. Manually move the elevator downward.
<F1> « > <F2> ◀ > <F3> ► ► <F4> » >	Return to <i>Main</i> menu. Select previous <i>Hand</i> sub menu. Select next <i>Hand</i> sub menu. Enter selected <i>Hand</i> sub menu.
<F1> « > <F2> Not used <F3> Not used <F4> On/Off >	Return to previous display. Not used in this display. Not used in this display. Toggle elevator brake status.
<F1> « > <F2> ◀ > <F3> ► ► <F4> » >	Return to <i>Main</i> menu. Select previous <i>Hand</i> sub menu. Select next <i>Hand</i> sub menu. Enter selected <i>Hand</i> sub menu.
<F1> « > <F2> Not used <F3> Not used <F4> On/Off >	Return to previous display. Not used in this display. Not used in this display. Toggle belt cylinder status.



<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle belt motor status.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle Smema IN Ready status.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle Smema OUT Board available status.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle green lamp status.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle yellow lamp status.</p>



<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle red lamp status.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; ◀ &gt;          &lt;F3&gt; ▶ &gt;          &lt;F4&gt; » &gt;</p>	<p>Return to <i>Main</i> menu.          Select previous <i>Hand</i> sub menu.          Select next <i>Hand</i> sub menu.          Enter selected <i>Hand</i> sub menu.</p>
<p>&lt;F1&gt; « &gt;          &lt;F2&gt; Not used          &lt;F3&gt; Not used          &lt;F4&gt; On/Off &gt;</p>	<p>Return to previous display.          Not used in this display.          Not used in this display.          Toggle buzzer status.</p>

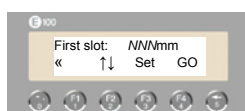
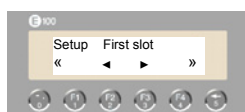
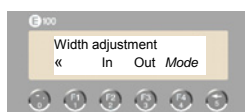
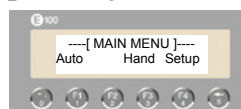
## Setup mode

This mode is used to set up the machine for operation.

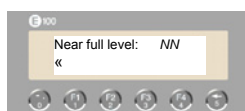
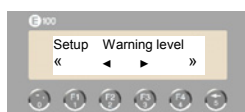
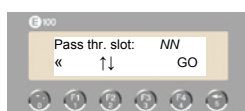
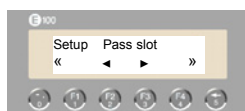
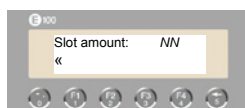
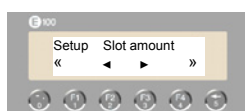
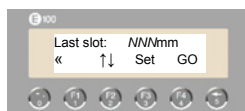
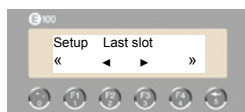
Password login is required to change most settings in *Setup* mode. Trying to modify a not modifiable parameter or to change a setting without entering correct *Password level* will generate the message "Access denied!" for a few seconds on the control panel.

*Setup* sub menus are described on the following pages.

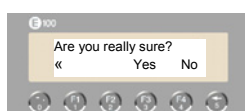
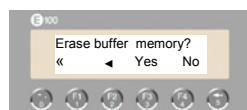
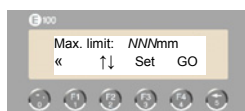
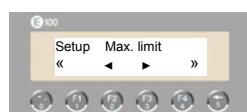
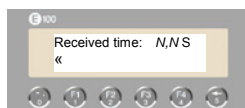
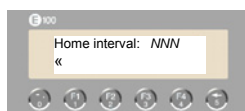
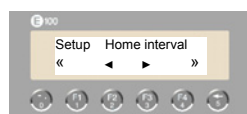
Select *Setup* mode by pressing <F4 Setup> in the *Main* menu.



Parameter/ <Button>	Description
<u>First display view in Setup mode</u>	
<F1> « >	Return to <i>Main</i> menu.
<F2> Not Used	Not used in this display.
<F3> ► >	Select next <i>Setup</i> sub menu.
<F4> » >	Enter selected <i>Setup</i> sub menu.
<F1> « >	Return to previous display.
<F2> In >	Decrease width. **
<F3> Out >	Increase width. **
<F4> Auto/ Man. >	Toggle Manual/Automatic width adjustment.
Mode	Shows currently selected width adjustment mode.
	** Manual width adjustments are only possible when Manual width adjustment is selected.
<F1> « >	Return to <i>Main</i> menu.
<F2> Not used	Not used in this display.
<F3> ► >	Select next <i>Setup</i> sub menu.
<F4> » >	Enter current <i>Setup</i> sub menu.
<F1> « >	Return to previous display.
<F2> ↑↓ >	Go to elevator control.
<F3 Set >	Sets the current elevator unit position as the level of the first slot in the magazine. If the uppermost magazine slot is set as first slot, board buffering will begin at that slot and proceed downwards. If the lowermost magazine slot is set as first slot, board buffering will begin at that slot and proceed upwards.
<F4 GO >	Move the elevator to the position entered at NNNmm.
NNNmm	Distance in millimetres, from home position to first slot. This value can be changed manually via the control panel. Do not press <F3 Set > after a manual change.



Parameter/ <Button>	Description
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » >	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu.
<F1 « > <F2> ↑↓ > <F3 Set > <F4 GO > NNNmm	Return to previous display. Go to elevator control. Sets the current elevator unit position as the level of the last slot in the magazine. Move the elevator to the position entered at NNNmm. Distance in millimetres, from home position to last slot.
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » > <F1 « > NN	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu. Return to previous display. Total number of slots in the magazine.
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » > <F1 « > <F2> ↑↓ > <F4 GO > NN	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu. Return to previous display. Go to elevator control. Move the elevator to the slot entered at NN. Slot number used as pass through slot when the machine runs in pass through mode.
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » > <F1 « > NN	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu. Return to previous display. Enter desired near full warning level. The machine will display a warning message and light the yellow status lamp when remaining number of empty magazine slots are equal or less than the entered number. Note: The near full warning is disabled (no warning will occur) if the warning level is set to 0.



Parameter/ <Button>	Description
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » >	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu.
<F1 « > NNN	Return to previous display. Enter desired home position interval. The elevator will perform a home positioning sequence with the interval entered. The interval is specified in number of boards sent to the following machine. Note: No home positionings will be performed if the interval is set to 0.
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » >	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu.
<F1 « > N,N S	Return to previous display. Enter desired PCB received time in seconds. Received time is the time the infeed sensor must be free before the buffer accepts the PCB as received.
<F1 « > <F2> ◀ > <F3> ▶ > <F4 » >	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Select next <i>Setup</i> sub menu. Enter current <i>Setup</i> sub menu.
<F1 « > <F2> ↑↓ > <F3 Set > <F4 GO > NNNmm	Return to previous display. Go to elevator control. Sets the current elevator unit position as the maximum allowed distance from the home position sensor. Move the elevator to the position entered at NNNmm. Distance in millimetres, from home position to max. limit.
<F1 « > <F2> ◀ > <F4 Yes > <F4 No >	Return to <i>Main</i> menu. Select previous <i>Setup</i> sub menu. Go to confirmation screen. Return to <i>Main</i> menu.
<F1 « > <F2> Not Used <F4 Yes > <F4 No >	Return to previous display. Not used in this display. Confirm erase. Return to previous display. WARNING! Both manual and automatic width adjustments are allowed when buffer memory is empty. The width adjustment mechanism can be damaged if the memory is erased with remaining PCBs in the magazine.



## Password

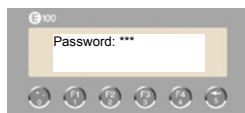
A password is required to change/view some settings under the *Setup* sub menu. A password is not required to operate the machine during production.

Automatic logout is made 5 minutes after login if no buttons are pressed on the control panel, or if the power is switched off.

## Password levels

Settings that require a password are assigned different password levels, depending on how critical the setting is. Available password levels are:

- *Password 1*. User level 1. The password is "1" by default.
- *Password 2*. User level 2. The password is "2" by default.
- *Password 3*. Service level. The password is "3" by default.
- *Password 4*. Manufacturer level 1.
- *Password 5*. Manufacturer level 2.
- *Password 6*. Not used.
- *Password 7*. Not used.
- *Password 8*. Not used.



Parameter/ <Button>	Description
	<u>Password login view.</u>
<NUM> + <0...9>	Use the numerical buttons to enter password for desired security level and close with <Enter>.
<F1 > < ↵ >	Return to <i>Setup</i> main view. Close password login. The action taken depends on the following: -If no password is entered, this view is left without any action. -If wrong password is entered, it is deleted and a new password can be entered or the view is left by pressing <Enter> again. -If correct password for any security level is entered, the message "Level is..." will be displayed for a few seconds, showing the corresponding security level before the previous display view is shown again.

## Alarms and messages

### Alarms

An alarm that occurs in any mode is indicated by a buzzer sound, red warning light, and an alarm text on the control panel.

The alarm text remains on the control panel display until the alarm is reset by pressing <F4 OK>, or the power is turned off.

### Messages

Some events cause messages to be shown on the control panel display, but no alarm is generated. The message text remains on the control panel until it is reset by pressing <F4 OK> or the power is turned off.

### Alarm and message table

The table below contains the alarms and messages that can be shown on the control panel.



Alarm / Message <Button>	Description
<F4 OK >	Press <F4 OK> for reset and return to previous screen.
ALARM / MESSAGE	See alternatives below.
<b>Access denied!</b> Cause:	Trying to modify a not modifiable parameter or to change a setting without entering correct <i>Password</i> level will generate this message for a few seconds on the control panel.
Action:	Enter a valid password before changing parameters.
<b>PLC not running!</b> Cause:	The PLC is in programming mode.
Action:	Flip the Stop/Run-switch on the PLC to Run position.
<b>Emergency stop!</b> Cause:	One or more emergency stop buttons are pressed down (activated).
Action:	Pull up (deactivate) all emergency stop buttons. Restart the machine.
<b>Elevator jammed!</b> Cause:	The PLC is unable to interpret the position encoder signals, or, the PLC did not receive any position encoder signals within a predefined time.
Action:	Loosen any jammed objects or replace the elevator motor.
<b>Elevator reached max. limit!</b> Cause:	The elevator has reached the maximum allowed (software) distance away from the home position sensor.
Action:	Shut down the machine at the main switch and back on again, and perform a home positioning.



Alarm / Message	Description
<b><i>Elevator infeed timeout!</i></b> Cause: Board transfer from preceding machine was not completed within predefined time. A possible cause is that the elevator width is not correctly adjusted, or that the buffer and preceding machine are misaligned.  Action: Remove the jammed or partially received board from the elevator. Reset alarm and start production (Auto mode) again.	
<b><i>Elevator outfeed timeout!</i></b> Cause: Board transfer to following machine was not completed within predefined time. A possible cause is that the width of the following machine is not correctly adjusted, or that the buffer and following machine are misaligned.  Action: Remove the jammed or partially transferred board from the elevator. Reset alarm and start production (Auto mode) again.	
<b><i>Elevator not home-positioned!</i></b> Cause: An elevator movement (or belt cylinder) was requested and the elevator is not home positioned.  Action: Perform a home positioning. Reset alarm and start production (Auto mode) again.	
<b><i>Belt motor cylinder not home!</i></b> Cause: An elevator movement was requested and the belt cylinders are not home.  Action: Reset alarm and start production (Auto mode) again.	
<b><i>Infeed blocked!</i></b> Cause: An elevator movement or width adjustment was requested and the infeed sensor is activated.  Action: Remove object. Reset alarm and start production (Auto mode) again.	
<b><i>Outfeed blocked!</i></b> Cause: An elevator movement or width adjustment was requested and the outfeed sensor is activated.  Action: Remove object. Reset alarm and start production (Auto mode) again.	
<b><i>Elevator direction error!</i></b> Cause: The PLC received inverted encoder information during elevator movement.  Action: Reset alarm and start production (Auto mode) again.	
<b><i>Buffer not empty!</i></b> Cause: A width adjustment request was made and the buffer is not empty.  Action: Reset alarm and start production (Auto mode) again.	

## Signal tower

The machine is equipped with a Signal tower, (beacon).



*Figure 3-3 Signal tower*

### **Buzzer**

A built-in buzzer is on when an alarm has occurred, for two seconds when the buffer is full, or for two seconds if the near full warning level is reached.

### **Red light**

Red light indicates active alarm. The red light may also flash once during start-up and shutdown.

### **Yellow light**

Yellow light is lit in *Automatic* mode if the magazine is full or the near full warning level is reached.

### **Green light**

Green light indicates machine in production, i.e. the Buffer is in production in *Automatic* mode and no error has occurred.

## 4. Operation Setup

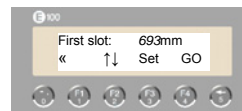
### Setting up the machine for operation

The setup procedures in this chapter are intended to be performed in a continuous sequence. Therefore, the activity numbering is made consecutively throughout the chapter.

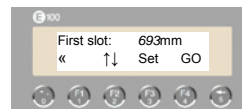
#### Setting first slot level

First slot level is the level of the first slot in the magazine. If the uppermost slot is set as first slot, buffering will begin at that slot and proceed downwards. If the lowermost slot is set as first slot, buffering will begin at that slot and proceed upwards.

1. Press <F4 'Setup'> at *Main* menu, <F2 ►>, and then <F4 »> to enter *First slot* sub menu.



2. Press <F2> ↑↓> to go to elevator control and perform a home positioning by pressing <F2> Home >. Use the orange buttons <▲> and <▼> to move the elevator to desired level, press <F1 <>> to return to *First slot* sub menu, press <F3> Set> to store current elevator position as the first available magazine slot. Fine adjustments are possible by manually modifying the numerical value and pressing <F4> GO> to verify position. Instructions on how to use the numerical buttons are found on page 12. Do not press <F3> Set> after manually modifying the position value.

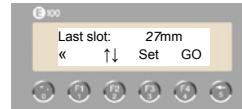


3. Press <F1 <>> to go back to the previous screen.

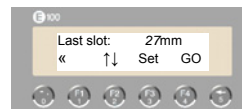
### Setting last slot level

Last slot level is the level of the last slot in the magazine.

4. Locate the *Last slot* sub menu.



5. Press <F2> ↑↓> to go to elevator control, use the orange buttons <▲> and <▼> to move the elevator to desired level, press <F1 <>> to return to *Last slot* sub menu, press <F3> Set> to store current elevator position as the last available magazine slot. Fine adjustments are possible by manually modifying the numerical value and pressing <F4> GO> to verify position. Do not press <F3> Set> after manually modifying the position value.



6. Press <F1 <>> to go back to the previous screen.

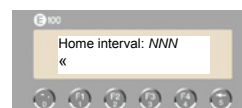
### Setting the home positioning interval

This value determines how often the elevator will perform a home positioning during production (Automatic mode ON). The numerical value represents number of PCBs transferred to the following machine.

7. Locate the *Home interval* sub menu and press <F4 >>>.



8. Type in a new value at *NNN* and press <Enter>.

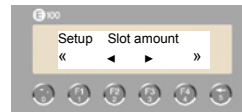


9. Press <F1 <>> to go back to the previous screen.

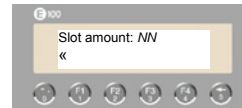
### Setting the Slot amount

This value must equal the total number of slots in the magazine.

10. Locate the *Slot amount* sub menu and press <F4 »>.



11. Type in a new value at *NN* and press <Enter>.



12. Press <F1 «> to go back to the previous screen.

### Setting the stepping, start slot value, and work mode

The step value determines how many slots the elevator moves before processing next PCB. The start slot value determines the first magazine slot that will be processed. Available work modes are: FIFO, LIFO, and Pass through.

13. Press <F2 ►> when in *Auto* menu to enter *Stepping* and *Start slot* settings.

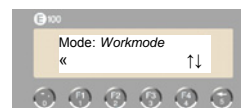


14. Type in a new stepping value at *nn* and press <Enter>, and a new start slot value at *NN* and press <Enter>.



15. Press <F2 ►> to enter *Work mode* setting.

16. Press <F4> ↑↓> until desired work mode is displayed.



17. Press <F1 «> to go back to *Auto* menu.

**Setting max. limit**

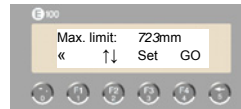
Max. limit is the maximum allowed moving distance (stroke length) for the elevator unit. The distance is measured from home position at the physical uppermost elevator position.



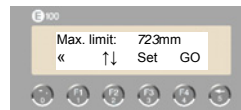
*Max. limit is always set at the manufacturer.*

*A manufacturer password is required to change the value as an incorrect distance can cause machine damage.*

18. Locate the *Max. limit* sub menu.



19. Press <F2> <> to go to elevator control. Use the orange buttons <▲> and <▼> to move the elevator to desired level, press <F1> <<> to return to *Max. limit* sub menu, press <F3> Set> to store current elevator position as the elevator max. limit. Fine adjustments are possible by manually modifying the numerical value and pressing <F4> GO> to verify position. Do not press <F3> Set> after manually modifying the position value.



20. Press <F1> <<> to go back to the previous screen.

**Finishing the Setup**

The operation setup is now completed.

Set the machine in production mode as described in the section *Automatic mode*, in Chapter 3, page 13.



*The machine contains moving parts that can cause damage and personal injury, if handled incorrectly.*

*Read the safety instructions in Chapter 1, Safety.*

## 5. Maintenance

The maintenance instructions in this chapter comprise weekly, monthly, and six-month maintenance for the machine.

The maintenance is very important for a continuous operation without unintentional stops.

Follow the maintenance instructions carefully and keep the machine clean.

### Lubricants

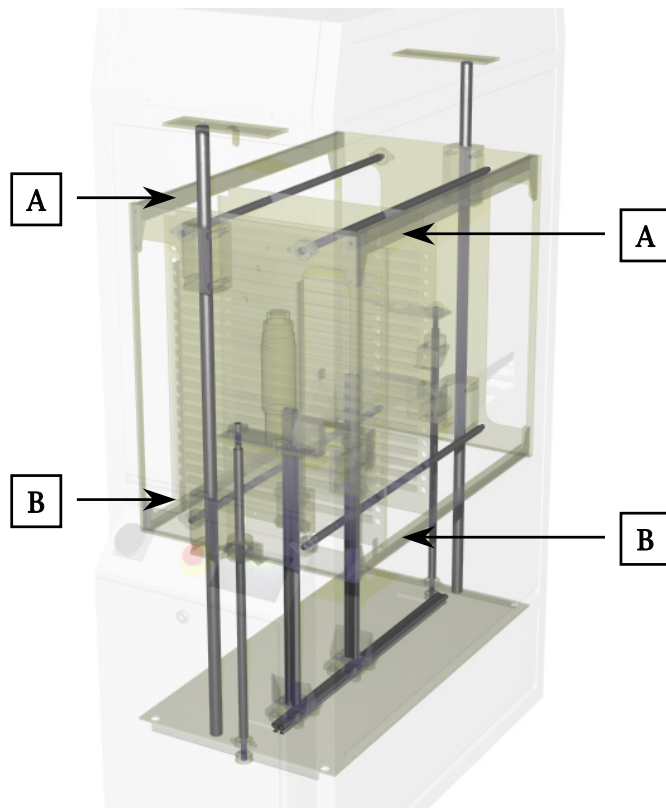
Unless other is stated, use the OKS 270 grease.

Grease should be applied in small amounts, just to give a thin film.

Specifications and part #'s for the lubricants are found in the end of this chapter.

### Weekly

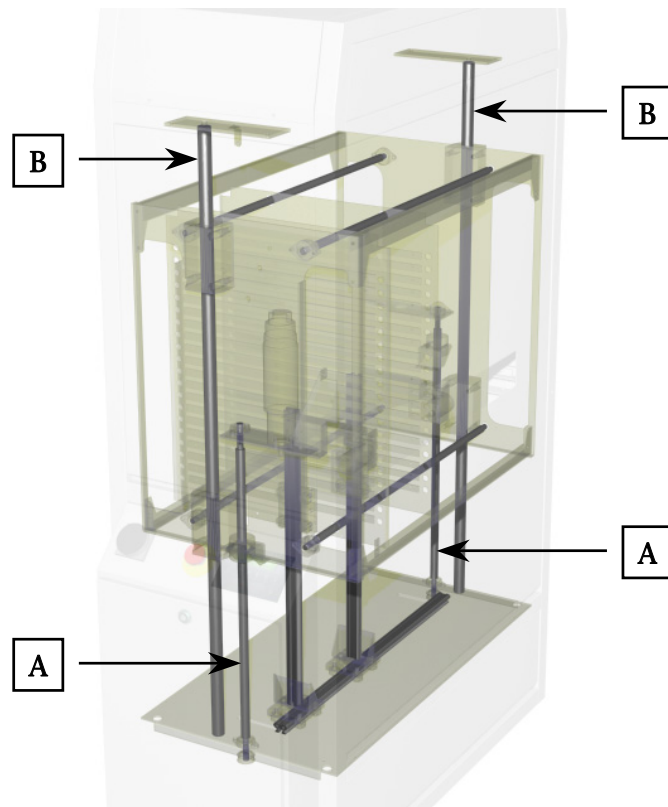
- Clean the machine all over.
- Wipe off dust and dirt from both optical PCB sensors (A) and reflectors (B) located on the magazine frame.



*Figure 5-1 Elevator, PCB sensors and reflectors*

## Monthly

- Lubricate elevator lead screws (A). If the screws are clogged by dust and dirt, wipe them off with a cloth. Apply Inno Flexon spray to the whole length of the screws. Use a small amount of lubricant, just to get a thin film.
- Lubricate elevator guides (B). Remove any dust or dirt from the guides. Apply a small amount of OKS 270 grease to the whole length of the two guides.

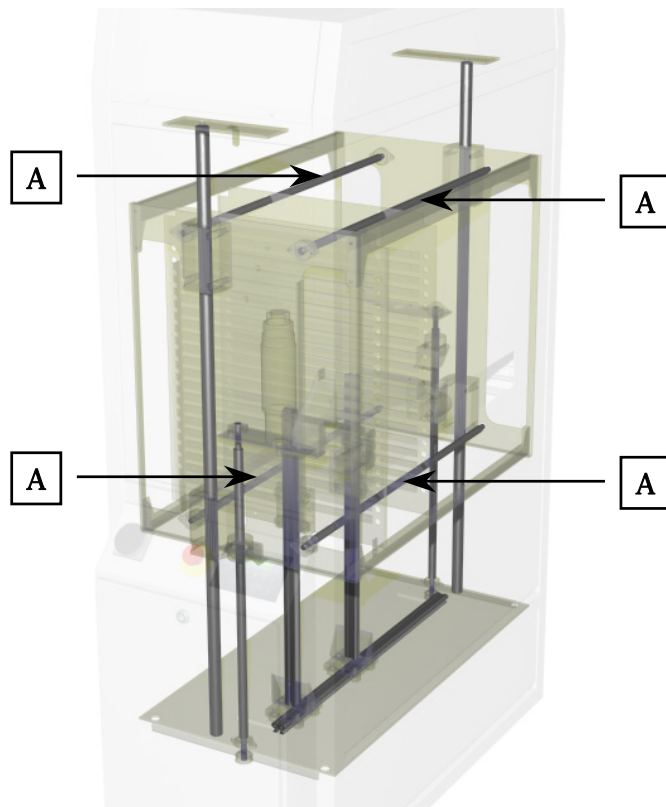


*Figure 5-2 Elevator, lead screws and guides*



## Six-month

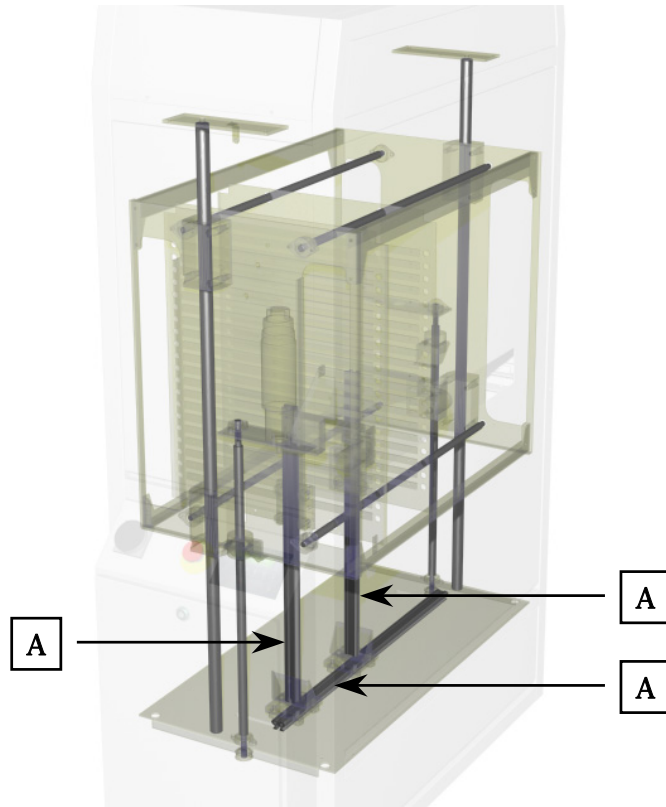
- Check condition of the PCB conveyor belts in the magazine. Renew belts if required.
- Lubricate all lead screws for width adjustment (A). If the screws are clogged by dust and dirt, wipe them off with a cloth. Apply Inno Flexon spray to all screws on the magazine. Use a small amount of lubricant, just to get a thin film.



*Figure 5-3 Magazine, width adjustment lead screws*

## Six-month, continued

- Lubricate guideways for belt driving mechanism (A). Remove any dust or dirt from the guides. Apply a small amount of OKS 270 grease to the whole length of the three guides.



*Figure 5-4 Elevator, guideways for belt driving mechanism*

## Lubricant specifications

This section contains lubricant data for:

- OKS 270 grease
- Inno Flexon

### **OKS 270**

OKS 270 is the base lubrication grease for the machine.

#### **Data**

Full product name: OKS 270

Type: Grease paste

Colour: Whitish

Flash point: >210°C

#### **Supplier in Sweden**

TriboTec AB

Box 203

S-435 24 Mölnlycke, Sweden

Phone: Nat. 031-88 78 80 Int. +46 31 88 78 80

[www.tribotec.se](http://www.tribotec.se)

#### **Manufacturer**

OKS Spezialschmierstoffe GmbH

Triebstraße 9

D-80993 München

Phone: Nat. 089-14 98 920 Int. +49 89 14 98 920

[www.oks-germany.com](http://www.oks-germany.com)

### **Inno Flexon**

Inno Flexon is a synthetic oil/Teflon compound for all lead screws in the machine.

#### **Data**

Full product name: Inno Flexon

Type: Transparent spray

Working temperature: -40 - +180°C

#### **Supplier in Sweden**

Innoscandia AB

Phone: Nat. 0470-74 60 00 Int. +46 470-74 60 00

[www.inno.se](http://www.inno.se)